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ABSTRACT

This module (recommended for grades 5 or 6) provides information on water in the community. Topics considered include: safe water (showing how clear water may be unsafe to drink); water sources; drinking water and wells; clean water underground; how water gets from the ground to the faucet inside a home; the groundwater of seaside and inland cities; and water conservation methods. The text is accompanied by numerous illustrations and cartoons. (JN)

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What We Take From Our Environment

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Water in Your Community

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WATER IN YOUR COMMUNITY
(Recommended Grade Level: 5-6)

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ONE DAY IN A CAMPSITE
YOU ARE GOING TO KNOW THIS PLACE. 3 OF YOU GO NORTH, 3 GO EAST, 3 WILL GO WEST.
AFTER 2 HOURS, HERE ARE THE BOYS WHO WENT EAST.
WE FORGOT OUR CANTEEN!
I HOPE WE CAN FIND WATER FOR DRINKING NEARBY.
LATER THEY FOUND A SPRING.
YEHEY! CLEAR WATER!
ROBERTO, WAIT! THAT WATER MAY NOT BE SAFE FOR DRINKING.

Figure 1

What is safe water? What will happen to Roberto if he drinks water that is not safe for drinking?

He may get sick like this boy who has typhoid.

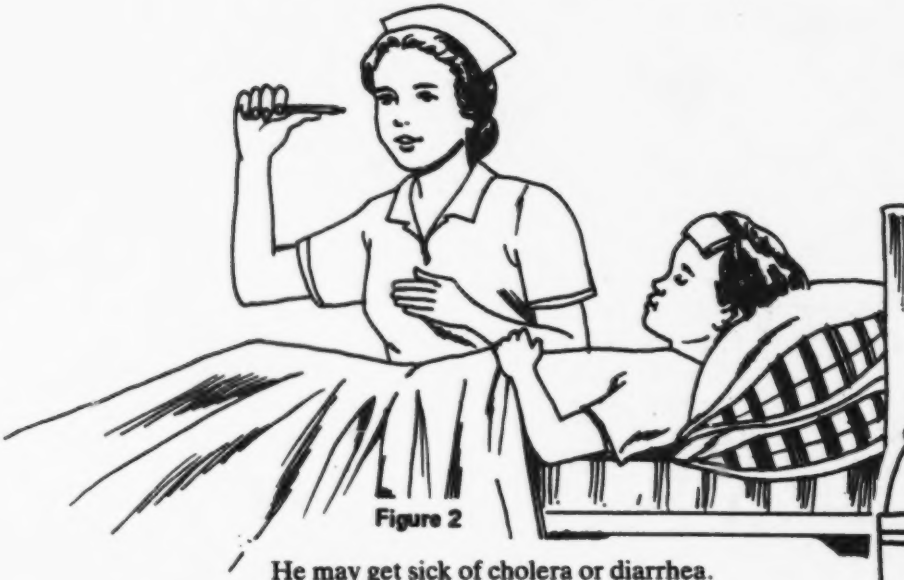

Figure 2

He may get sick of cholera or diarrhea.

Figure 3a

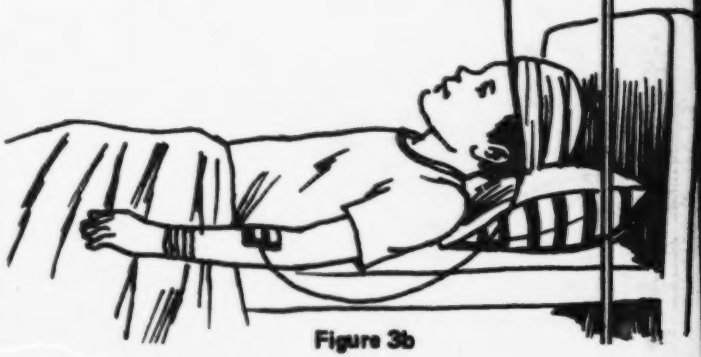

Figure 3b

Worms may get inside his body.
What will happen to Roberto if the water contains poison?

Figure 4

Water can be very clear and yet not safe to drink.

Figure 5

In your homes, you do not worry much about your water. When you open your faucet, safe water comes out. If you stay in Metro Manila, the Metropolitan Waterworks and Sewerage System (MWSS) takes care of supplying you with safe drinking water. If you stay outside of Metro Manila your water district takes care of your water.

But many places in our country have water problems. Many have to travel far to fetch safe water for their families.

Figure 6

That is why our government is putting much money on water projects so that safe water can reach as many people as possible. This is also the aim of the United Nations, to bring safe water to everyone by the year 1990. The United Nations helps our government in providing safe water to many of our people.

Figure 7

If you do not have a water district in your town or city, do you know that the Local Water Utilities Administration (LWUA) can help you put up one? The Rural Waterworks Development Corporation (RWDC) also helps towns and barrios put up water supplies.

Why Wells?

Many towns and cities in the Philippines get water from the ground. Some like Calamba in Laguna get water from springs. Metro Manila gets its water from rivers but the water from the rivers has to be treated to become safe. Nine out of ten water districts in the country get water from the ground.

Housing subdivisions and houses in places with no water system also get water from the ground.

The diagram below shows how the waters of the earth are distributed.

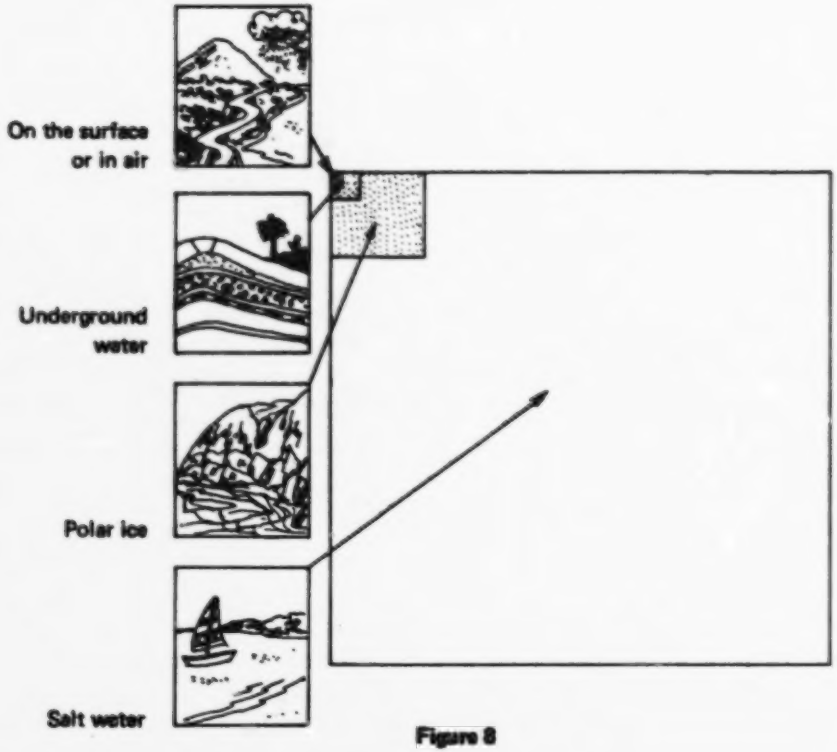

Figure 8

Adopted from the Australian Science Education Project (ASEP).

The biggest amount of the water on this earth is salt water. This is not ready for drinking. The next biggest is water frozen as polar ice found in the north and south poles. What are available for our use are the water found in the earth's surface and the water found below the ground.

If you compare the amount of surface water to that of groundwater, you will notice that the surface water is very little compared to the water stored under the ground.

Do you see now why many use wells for their water supply?

But water from wells can also be made unsafe if people do not take care of the groundwater. The following story of a family will show this.

Drinking Water and Wells

The Magsino family lives in this community.

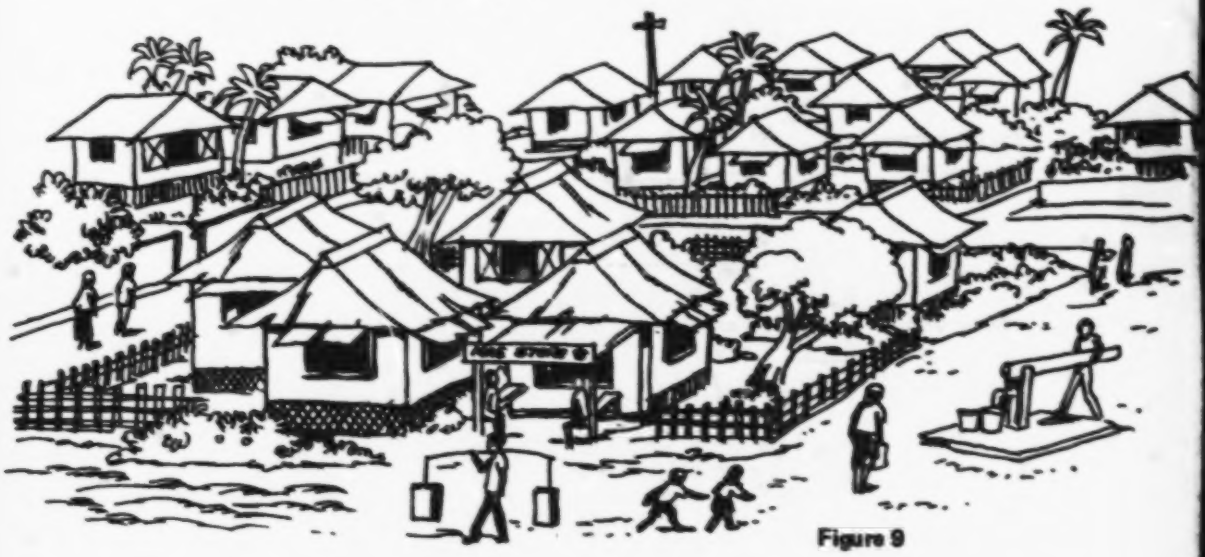

Figure 9

They have stayed here for the last two years. Ever since, they have been getting their water from a well which belongs to a neighbor.

Mr. Magsino is not content with this arrangement. He wants a well of their own. He also knows that his neighbor's well is well built. So he decides to look closely at how the well was constructed. He studies the well, asks questions from the owner and soon he is making a sketch of the well he is going to put up.

Below is a sketch of Mr. Magsino's well.

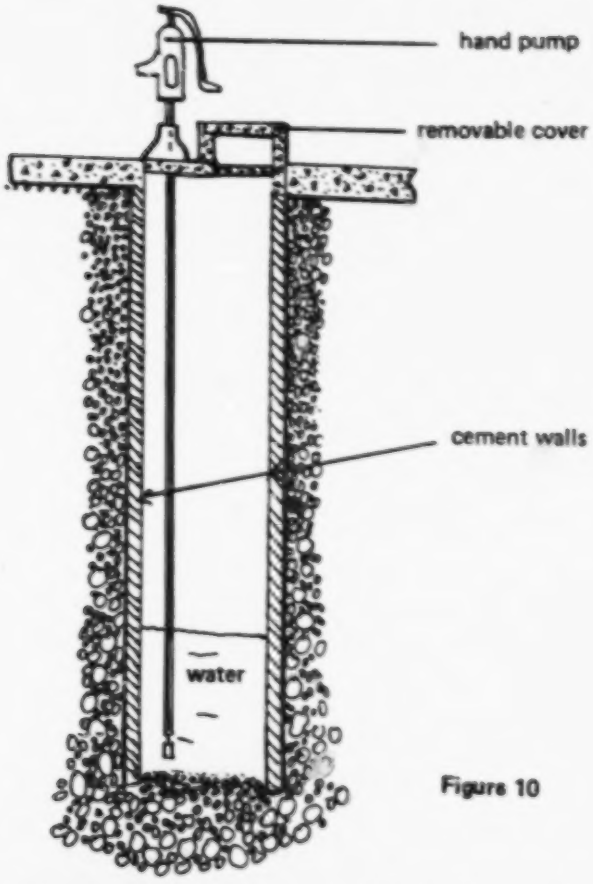

Figure 10

If you study the drawing of the well, you will notice that flies, mosquitoes and other insects cannot get inside the well. Dirty water from the upper soil cannot easily go inside. The well is a sanitary well.

Soon, Mr. Magsino had his well built. When it was finished, the Magsino children and their immediate neighbors were very happy because they do not have to carry water from afar anymore.

Cecilia Magsino's teacher who lived two houses away was also happy. However, she wanted to make sure the well would give safe water to her neighbors. So she helped the Magsino family send a small amount of the well water to the nearest branch of the Ministry of Health.

One of the things the Ministry of Health can do is to check the safety o drinking water.

Figure 11

When the result of the water check arrived, Mr. Magsino put a sign near their well.

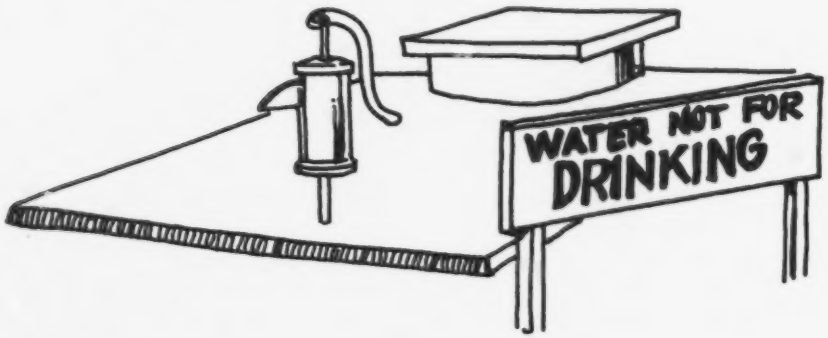

Figure 12

Now the Magsino and their neighbors use the water for washing, cleaning and watering the plants.

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Cecilia wonders . . .

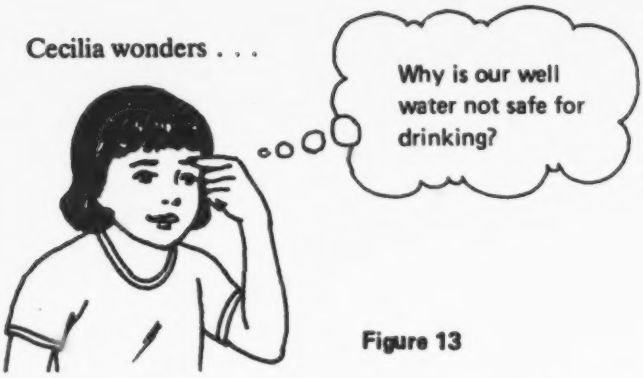


Figure 13

Are you wondering too, why the water in the Magsino well is not safe for drinking?

Cecilia searched for some answers to her question.

Cecilia read about groundwater and wells.

Figure 14

She also asked persons who could help her.

shallow well
B
shallow well
A
toilet pit
toilet pit
dirty water
dirty water
soil with water
rocks that do not let water pass through
Compare the water that goes into well A with that which enters well B.
Is the water in well B safe?
Maybe that is the reason why our well water is unsafe.
Maybe it is not far enough from dirty pits.

Figure 15

Do you agree with Cecilia? Maybe there are other reasons that make their well water unsafe for drinking. Since dirt and germs can easily mix with the groundwater near the earth's surface, shallow wells can easily be made unsafe for drinking.

Clean Water Underground

There is also water in soil found deeper below the ground. This is found between rocks that do not hold water.

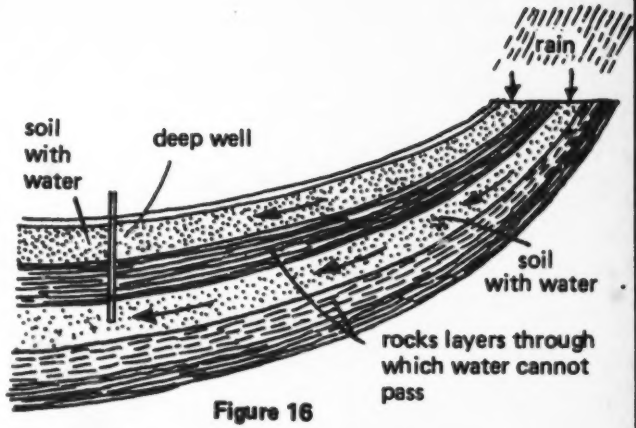


Figure 16

The water found here has travelled a long way and as it passed through many, many grains of soil, dirt and germs have been removed from it. The water is therefore clean. This is the water that people get for their drinking supply.

From the Ground to the Faucet

Are you one of those lucky enough to have faucet water? Take a look at your faucet. When the water faucet is closed, the water is locked up in the pipe. When you open the faucet, you open the lock and the water goes into your container.

But the water did not start in the pipe in your house. Water has come a long way before it gets into the pipe in your house.

On the following page is a picture showing how water travels from the ground to the pipes in places where the source of faucet water is groundwater.

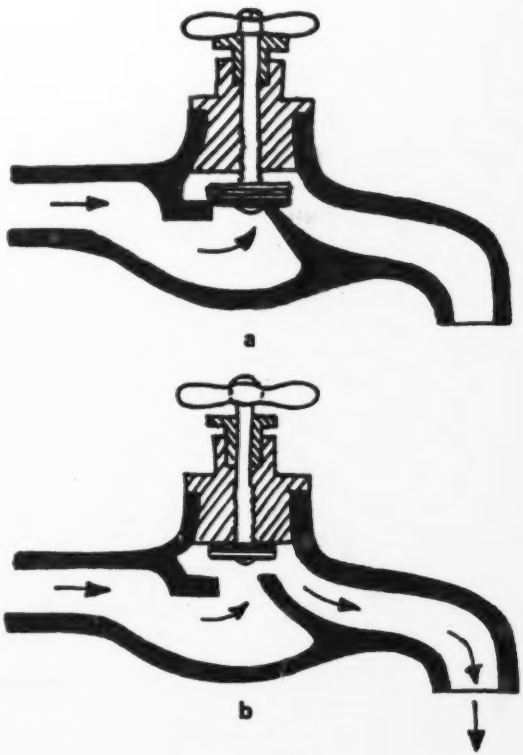


Figure 17

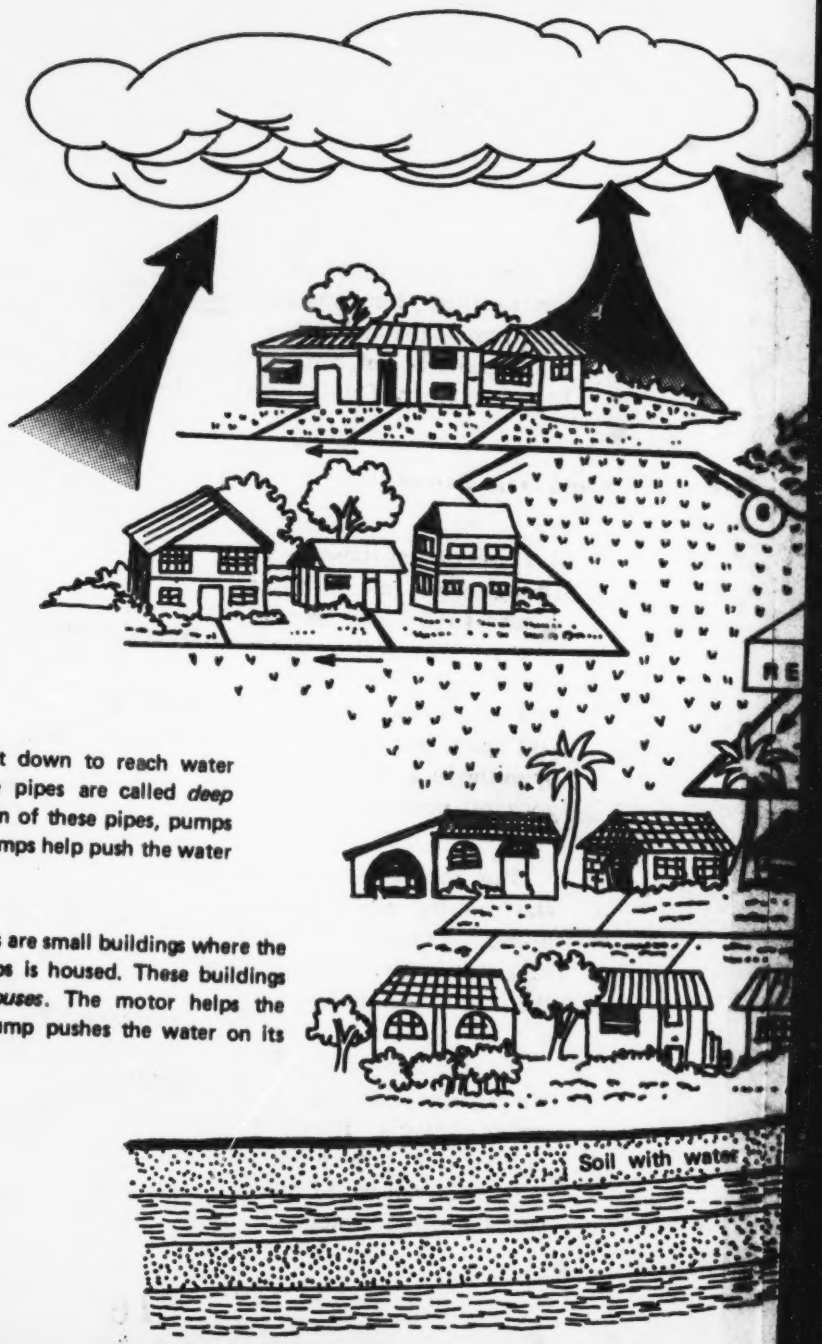
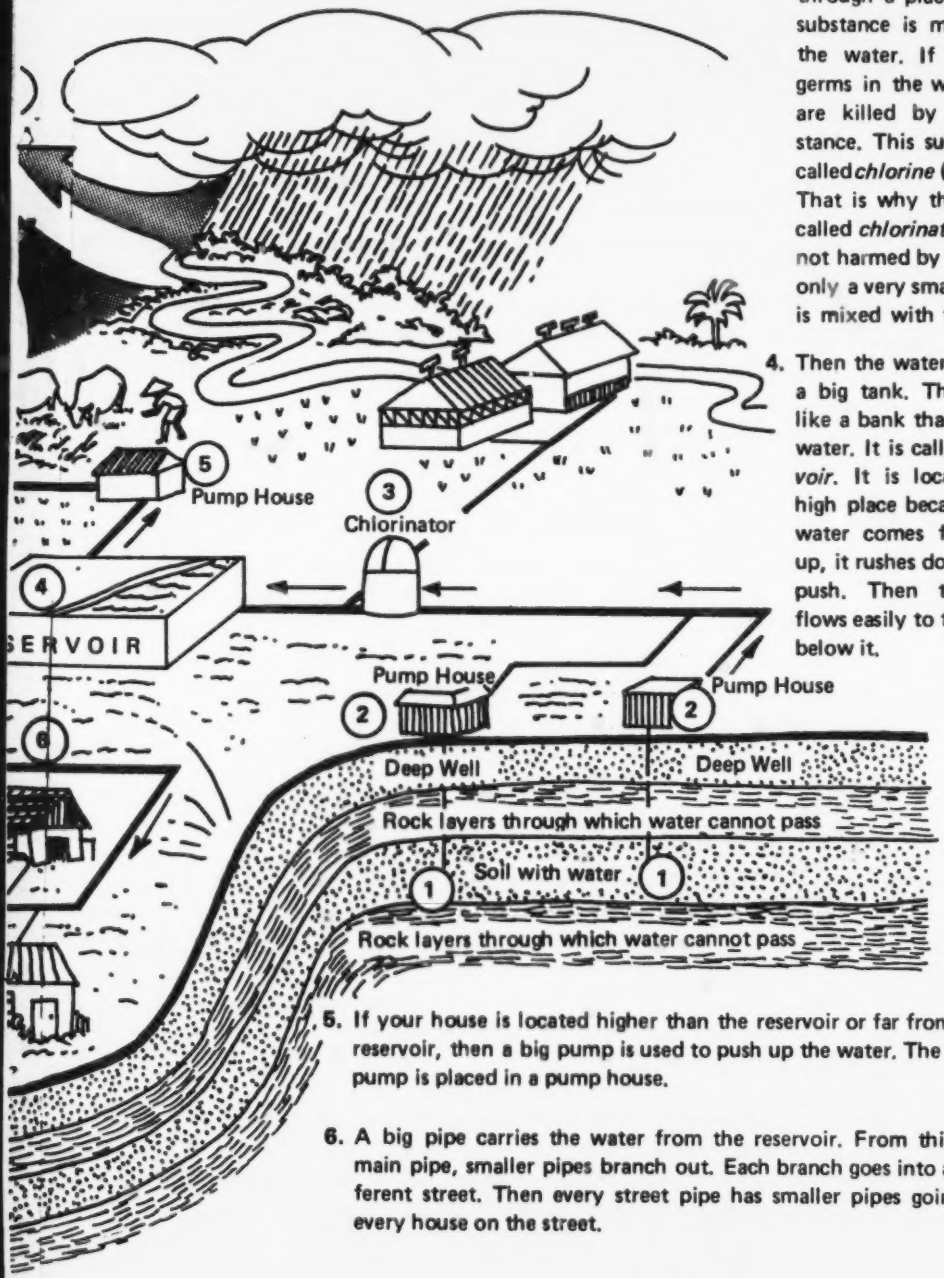


Figure 18

1. First pipes are sent down to reach water underground. These pipes are called *deep wells*. At the bottom of these pipes, pumps are installed. The pumps help push the water through the pipes.

2. Above the deep wells are small buildings where the motor for the pumps is housed. These buildings are called *pump houses*. The motor helps the pump work. The pump pushes the water on its way.



3. Then the water passes through a place where a substance is mixed with the water. If there are germs in the water, they are killed by this substance. This substance is called *chlorine* (clo-or-in). That is why the place is called *chlorinator*. Man is not harmed by it because only a very small amount is mixed with the water.

4. Then the water goes into a big tank. This tank is like a bank that saves up water. It is called a *reservoir*. It is located in a high place because if the water comes from high up, it rushes down with a push. Then the water flows easily to the houses below it.

5. If your house is located higher than the reservoir or far from the reservoir, then a big pump is used to push up the water. The pump is placed in a pump house.

6. A big pipe carries the water from the reservoir. From this big main pipe, smaller pipes branch out. Each branch goes into a different street. Then every street pipe has smaller pipes going to every house on the street.

This is how the water travels from the ground to your faucet.

But care must be taken in the use of groundwater because it can be destroyed if man will not take care of it. The stories that follow about the groundwater of Seaside and Inland cities best show how groundwater is destroyed.

The Groundwater of Seaside and Inland Cities

There were two brothers, Cicero and Hilario, who agreed to go their separate ways to build their own cities.

Cicero, who loves the sea, settled near one and named his place Seaside City.

Hilario, on the other hand, is a mountain lover. He settled in the interior of the country near the mountains. He called his place Inland City.

Seaside and Inland Cities are equally pleasant places to live in. Rainfall in both cities is evenly distributed throughout the year. When wells are drilled, water for the cities is obtained.

The well water is very important because there are no river or springs nearby Seaside City and Inland City.

Soon many other people from other places came in and settled in these two cities. The cities prospered. Yearly, new industries and places of business were put up and the number of people staying there increased tremendously.

With prosperity, the need for basic necessities also increased. Water was needed in much greater amounts because it was needed in industries, business and homes.

Many years later, a part of Seaside City looked like this.

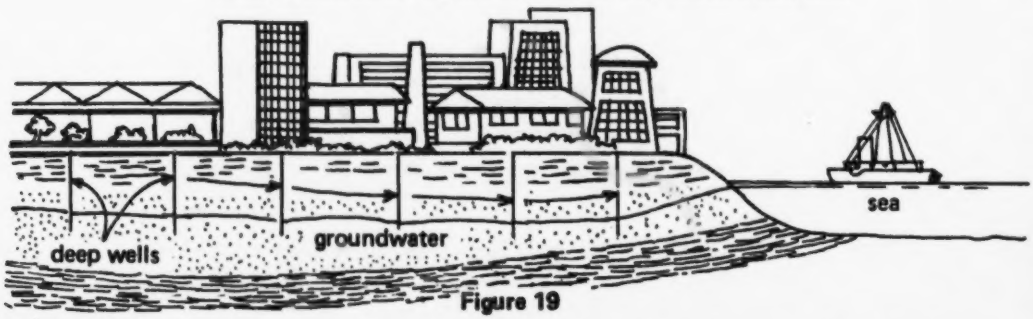


Figure 19

To meet its water needs Seaside City drilled many wells and these gave enough water to the people.

Year after year the need for water became greater. Many more wells were put up and more water was pumped out.

Do you think adding more wells solved Seaside City's water problem? Study the following illustrations and find out.

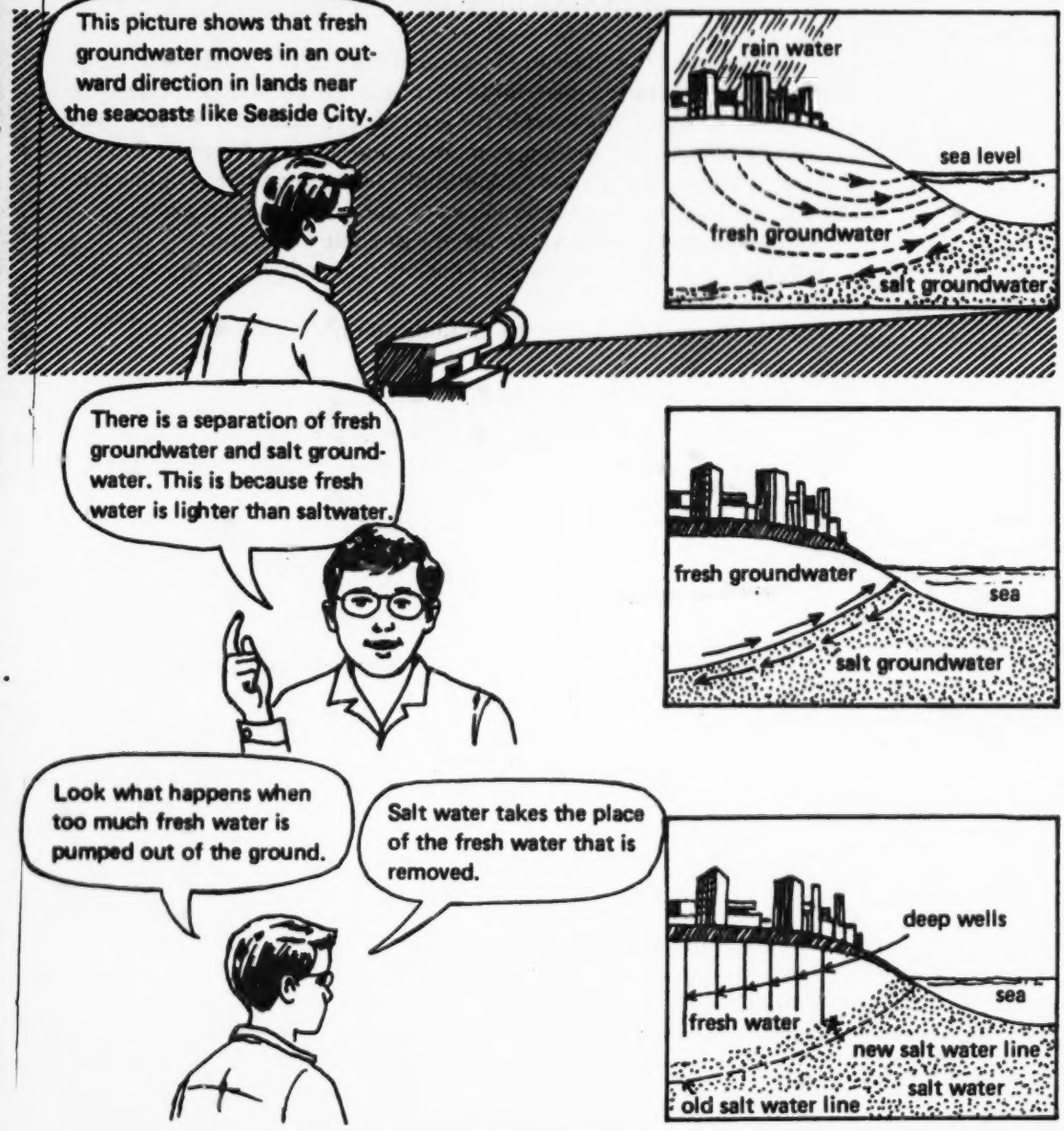

This picture shows that fresh groundwater moves in an outward direction in lands near the seacoasts like Seaside City.
rain water
sea level
fresh groundwater
salt groundwater
There is a separation of fresh groundwater and salt groundwater. This is because fresh water is lighter than saltwater.
fresh groundwater
sea
salt groundwater
Look what happens when too much fresh water is pumped out of the ground.
Salt water takes the place of the fresh water that is removed.
deep wells
sea
fresh water
new salt water line
salt water
old salt water line

Figure 20

Soon enough the people staying nearer the coast of Seaside City brought their problem to Cicero, the city's founder. Their wells were giving them salt water, something which never happened before.

What happened to Hilario and his city?

Hilario heard about the water in some of the wells of Seaside City and he was happy that he chose a place far from the sea. He knew that salt water was unlikely to mix with fresh water in the ground of Inland City. His city's need for water is greater today than years back and will still be greater in later years. But Hilario has no worry. He thinks his city can pump out as much water as the people want and no salt water can come into the wells.

For many years, no salt water mixed with their well water.

Is Hilario correct in thinking that the city can pump out as much water as it wants?

Find out by looking first at the groundwater of Inland City.

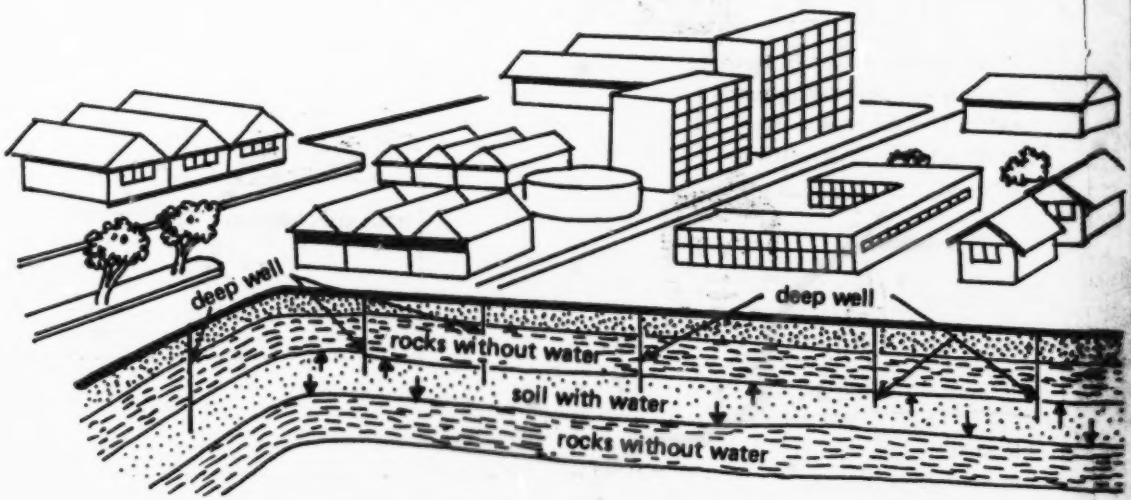


Figure 21

The water in the soil has a push that helps support rocks above it. If the amount of water removed from the soil is more than that which comes in, the water in the soil becomes less.

If the amount of water becomes less then the push is less. The rocks above it will press down on the soil. The soil then sinks. Then the land above it will also sink.

Hilario does not know this can happen. His city may be sinking slowly but he may not notice it immediately, not until several years later.

The soil holding water below his city can also be permanently compressed and damaged. Then the underground water supply of the city will be destroyed.

Evidences of land that is slowly sinking because of too much pumping out of groundwater are seen in many places of the world.

In Mexico City, the Basilica of Our Lady of Guadalupe has one side tilted because of the sinking of the land. The town hall of Venice in Italy has been slowly sinking since 1908 and many other buildings have been found to be sinking in that city. Because water has been pumped out too much to irrigate the land in the Central Valley in California, U.S.A., areas in it like the Santa Clara Valley have sunk 4 ft from 1960 to 1967. Bangkok, Thailand is sinking at the rate of 1/2 meter every 10 years because of too much removal of water from the ground.*

Conserving Water In Your Community

Think of the water in your community. Knowing some information about water is of little importance unless you use it.

Look at how some people waste precious water.

Letting the water run while brushing the teeth

Figure 22a

*The Philippine Government sees to it that our groundwater is kept safe and conserved by requiring any person to get a permit from the National Water Resources Council before drilling a well.

Leaking faucet

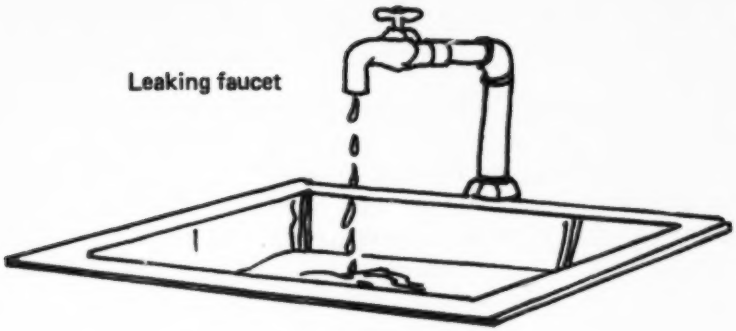
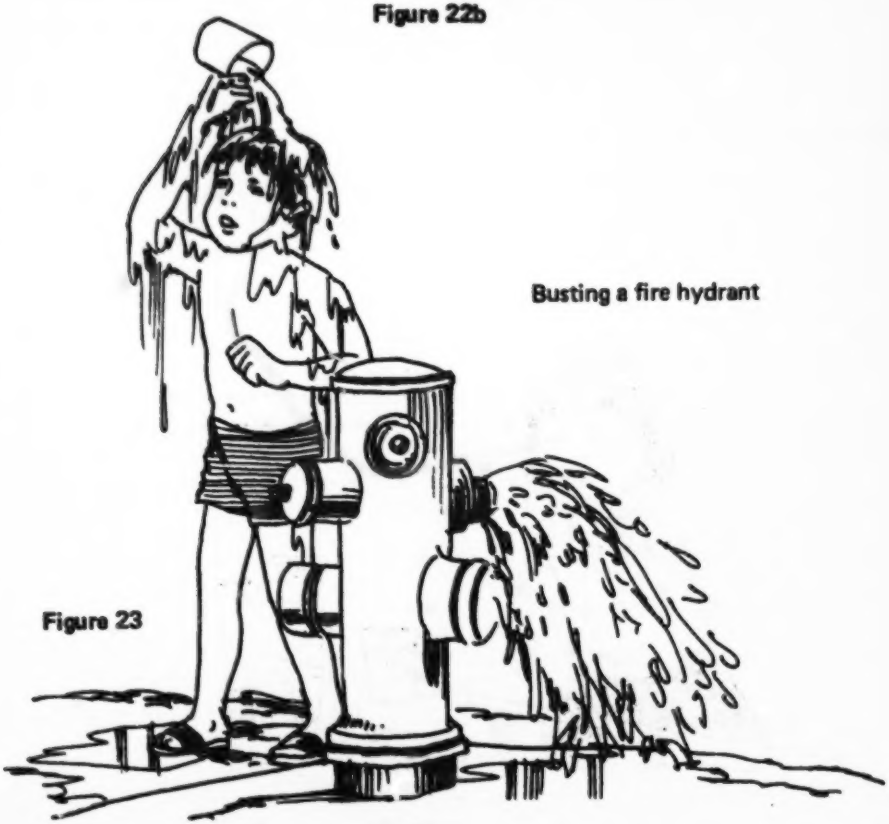


Figure 22b



Busting a fire hydrant

Figure 23

If you know some people who waste precious water, you can suggest ways for them to help conserve water.

You can call the office of your water district to report a busted fire hydrant in your locality.

Can you tell how the persons in the picture make safe water from the faucets unsafe for drinking?

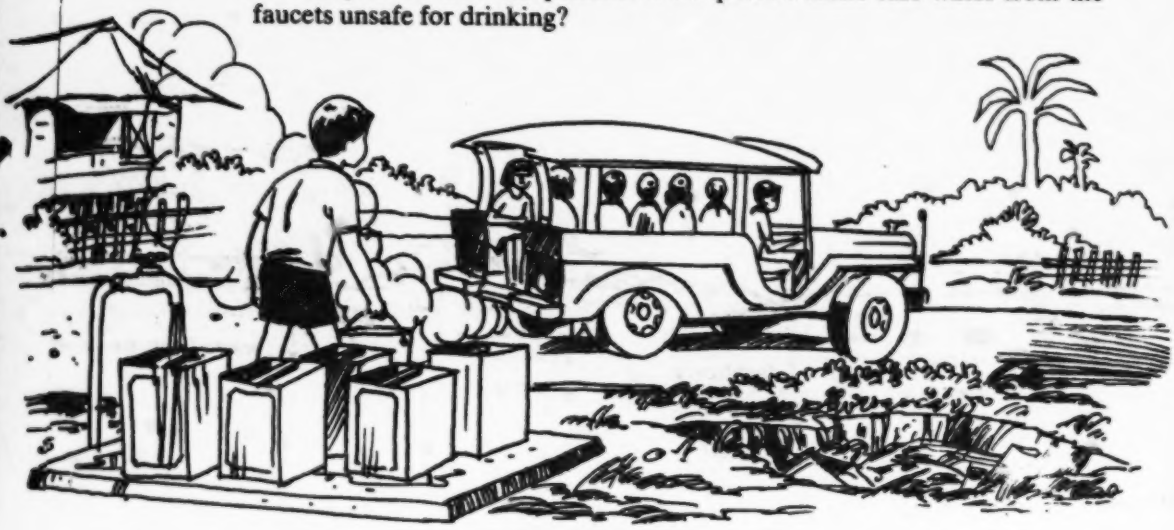


Figure 24

Figure 25

It is not enough that we have safe water from faucets. We should also handle it with care.

You can help inform people that they must use sanitary ways of handling water to keep it safe for drinking.

Study the picture below. The arrows show where most of the dirt from the land go. From these pictures, tell some of the ways man makes the groundwater unsafe.

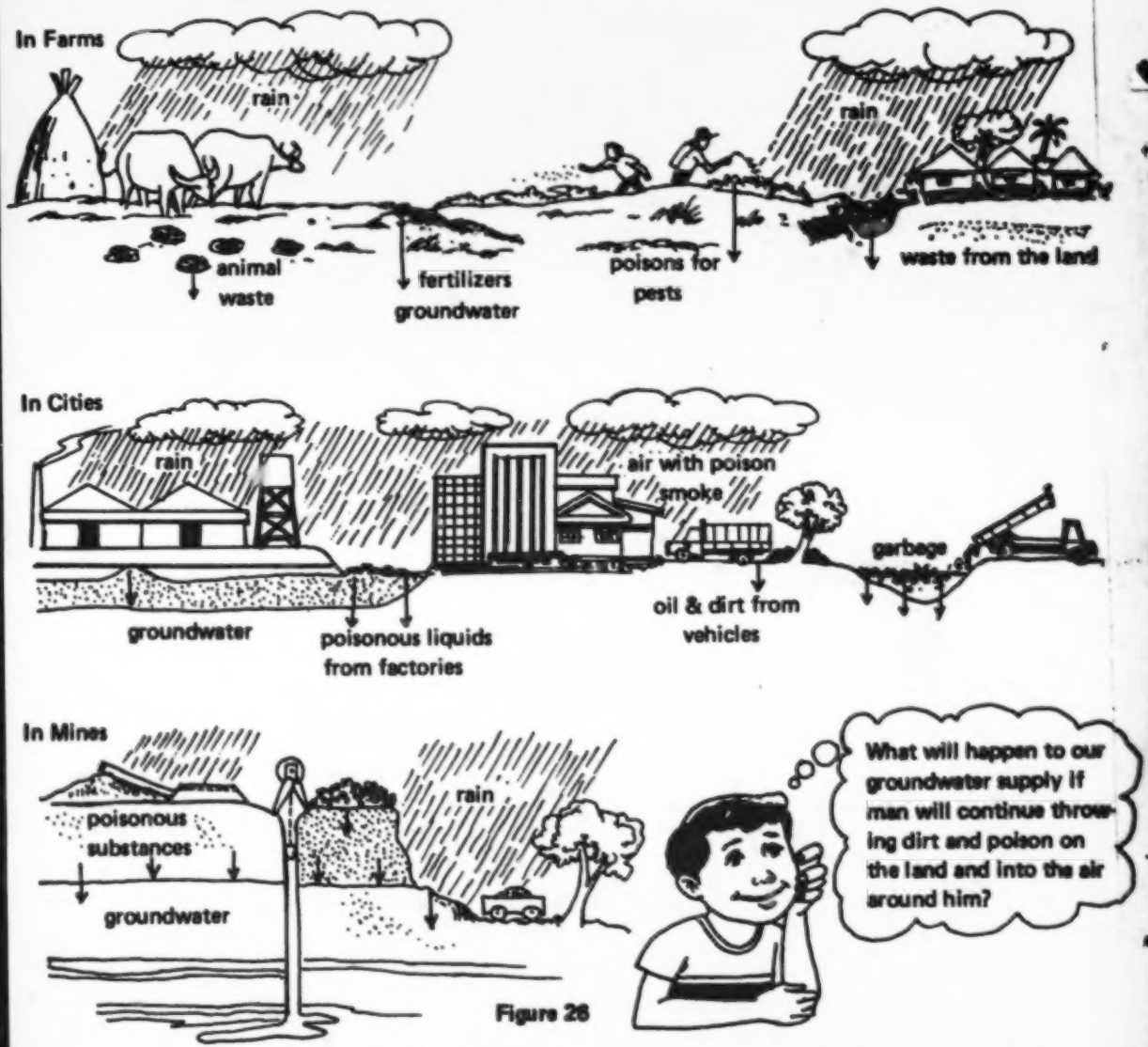


Figure 26

What can you do to help conserve water at home? What can you do to help keep the groundwater resource in your community?

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